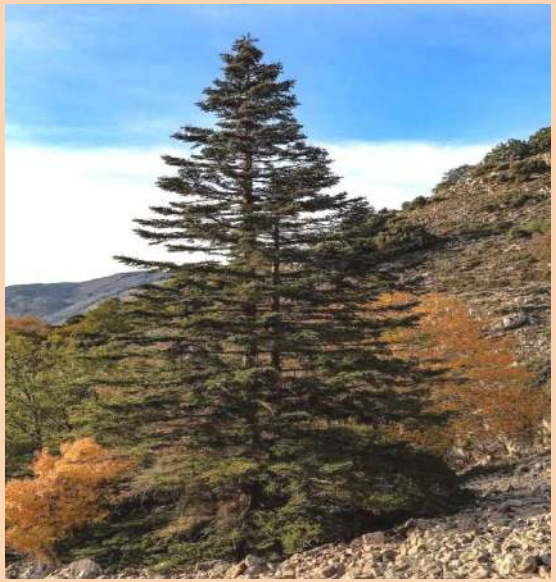
3rd Mediterranean Plant Conservation Week

CHANIA, CRETE, GREECE | 27 SEPTEMBER - 1 OCTOBER 2021

Plant Conservation Strategies: from Science to Practice

Conservation status of the endemic vascular flora of Sicily



Emilio Di Gristina[1,*], Enrico Bajona[2], Francesco M. Raimondo[2], Gianniantonio Domina[1]

[1]Department of Agricultural, Food and Forest Sciences, University of Palermo, Palermo, Italy
[2]PLANTA/Center for Research, Documentation, Palermo, Italy
*emilio.digristina@unipa.it

Among the large islands of the Mediterranean, Sicily is the one with the richest and most diversified plant heritage

Geographical location of Sicily in the Mediterranean basin

Over 3.250 specific and infraspecific taxa of native, naturalized or traditionally grown exotic plants are attributed to this island (Giardina & al. 2007, Raimondo & al. 2010)

The most represented families are: *Asteraceae*, *Poaceae*, *Fabaceae*, *Brassicaceae, Apiaceae*, *Caryophyllaceae*, *Lamiaceae, Rosaceae,* etc.

The only native flora of Sicily is made up of 2.763 specific and subspecific taxa (Bartolucci & al. 2018)

Pallenis maritima **(L.) Greuter**

Glandora rosmarinifolia **(Ten.) D.C.Thomas**

Iberis semperflorens **L.**

Giardina G., Raimondo F.M. & Spadaro V. 2007. A catalogue of the plants growing in Sicily. Bocconea 20: 5-582.

Raimondo F.M., Domina G. & Spadaro V., 2010. Checklist of the vascular flora of Sicily. Quad. Bot. Amb. Appl. 21 (2010): 189-252.

Bartolucci F. & al: 2018. An updated checklist of the vascular flora native to Italy. Plant Biosystems 152(2): 179-303.

The endemic contingent of the island accounts for just over 15%

Our updated account of the vascular flora of Sicily includes 430 endemics

The most represented families are: *Asteraceae*, *Fabaceae*, *Plumbaginaceae*, *Brassicaceae*, *Poaceae*, *Caryophyllaceae*, etc.

Cytisus aeolicus Guss.

Viola nebrodensis C.Presl

Petagnaea gussonei (Spreng.) Rauschert

Anthemis ismelia Lojac.

Bupleurum dianthifolium Guss.

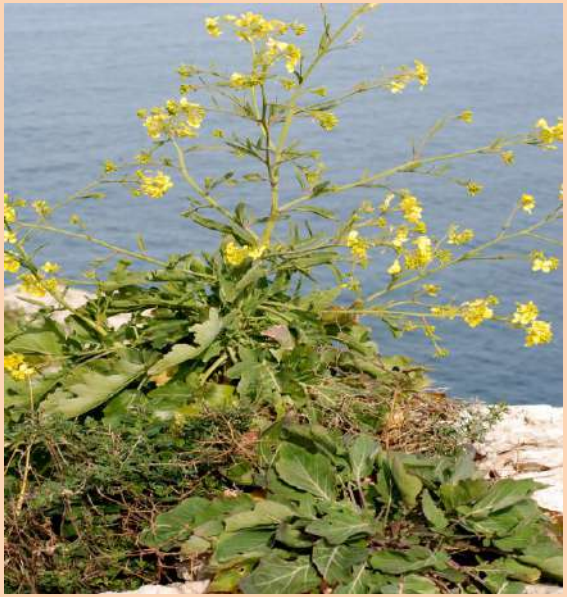
Armeria gussonei Boiss.

Centaurea erycina Raimondo & Bancheva

Genista gasparrinii (Guss.) C.Presl

Anthemis parlatoreana **Raimondo, Bajona, Spadaro & Di Grist.**

Dianthus rupicola Biv.



Brassica rupestris Raf.

Linum punctatum **C.Presl**

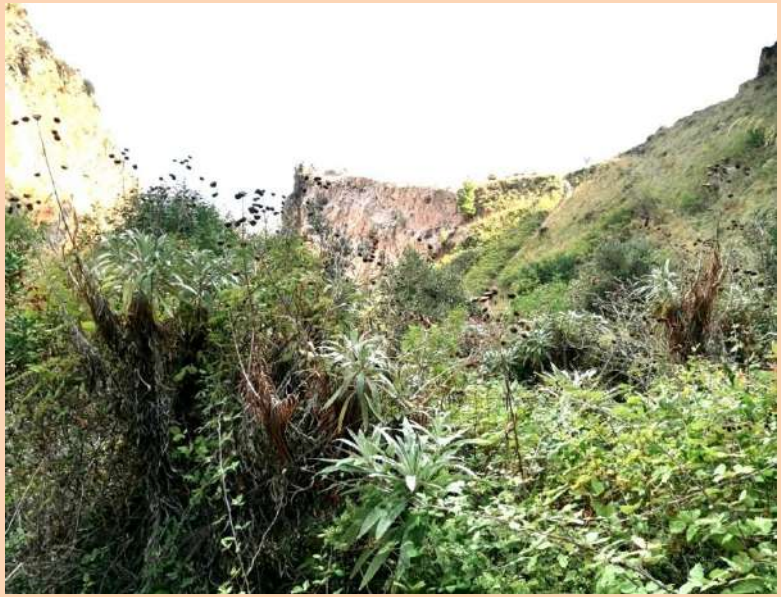
Erica sicula **Guss.**

Hexaphylla rupestris **(Tineo) P. Caputo & Del Guacchio**

The Sicilian endemic contingent includes taxa often with a punctual distribution. The number of endemics at risk of extinction has increased year by year. Several taxa, attributed to lower risk categories, even if they fall within protected areas do not enjoy any particular protection, others have seen reduced or altered their elective habitat, suffering a strong demographic contraction in populations

Adenostyles alpina subsp. *nebrodensis* (Wagenitz & I.Müll.) Greuter

Ptilostemon greuteri is a shrub known only from the northern slopes *of* Monte Inici (north-western Sicily). The entire population, located in the Cappellone Valley and in the valley between Pizzo Branco and Cozzo Monaco, is represented of a few thousand individuals. The repeated and close wildfires represent the main threat for the conservation of the species. *P. greuteri* was classified as Endangered (EN) at the time of the species description, currently it, thanks to the deepening of the exploration in the field that has made it possible to better estimate the size of the population and the threats, is listed as Critically Endangered (CR)



Ptilostemon greuteri **Raimondo & Domina in the valley between Pizzo Branco and Cozzo Monaco**

Abies nebrodensis (Sicilian Fir) is restricted to a small area of the Madonie Natural Park in Sicily. According to recent estimates, its only population consists of 30 adult individuals and a fluctuating number of juveniles derived from natural regeneration; besides, some hundreds of cultivated plants are preserved as *ex situ* collection

***Abies nebrodensis* (Lojac.) Mattei**

Zelkova sicula is a glacial relict tree, taking part in the conspicuous contingent of Sicilian relicts plants. At present day it is a very rare species exclusive from South-Eastern Sicily, belonging to a genus which became extinct in the whole continental Europe during the Quaternary Glacial Age. According to the IUCN Red List Categories and Criteria it is quoted as Critically Endangered (CR)

***Zelkova sicula* Di Pasq., Garfì & Quézel**

Calendula suffruticosa subsp. *maritima* (Sea Marigold), is a rare endemic species confined in few coastal sites in the province of Trapani (NW-Sicily) due to the destruction, alteration and fragmentation of the coastal habitat. Besides habitat destruction, the hybridization with the contiguous congener species *C. suffruticosa* subsp. *fulgida* is a major threat to its conservation. For this reason, it is listed amongst the 50 most threatened plants of the Mediterranean islands

***Calendula suffruticosa* subsp. *maritima* (Guss.) Meikle**

There are some contributions, including expert assessments, on the endangered flora of Sicily. Among these contributions, the evaluations carried out within the Italian Botanical Society on behalf of the Ministry of the Environment of the national government are only those that follow the scientific criteria proposed by the IUCN. The other censuses and evaluations in this regard are drawn up on the basis of estimates rather than detailed methodical evaluations

Not all the Sicilian endemic taxa **have received an assessment of their conservation status.**

Goal: How many taxa have not yet been assessed?

We integrated the data taken from the following previous published sources:

• Rossi G. et al. 2020. Lista Rossa della Flora Italiana, 2. Endemiti e altre specie minacciate. Ministero dell'Ambiente e della Tutela del Territorio e del Mare;

•Rossi G. et al. 2013. Lista Rossa della Flora Italiana, 1. Policy Species e altre specie minacciate. Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare;

•Brullo C. & Brullo S. 2020. Flora endemica illustrata della Sicilia. Laruffa Editore, Reggio Calabria.

• Raimondo F.M., Bazan G. & Troia A. 2011. Taxa a rischio nella flora vascolare della Sicilia. Biogeographia 30:229-239

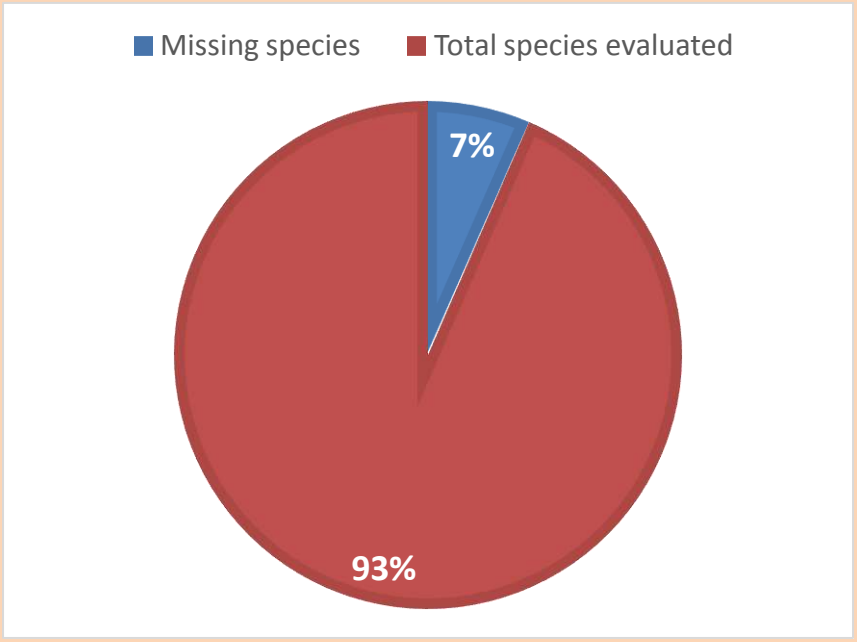
• Raimondo F.M., Gianguzzi L. & Ilardi V. 1992. Inventario delle specie a rischio della flora vascolare nativa della Sicilia. Quaderni Botanica Ambientale Applicata 3: 65-132.

	A	B	C	D	E
1	**Taxon**	**Raimondo & al. (1992)**	**Raimondo & al. (2010)**	**Brullo &Brullo (2020)**	**Rossi & al. (2013; 2020)**
2	Abies nebrodensis (Lojac.) Mattei	E1	CR2	CR3	CR4
3	Adenocarpus complicatus (L.) J.Gay subsp. bivonae (C. Presl) Peruzzi	R1		LC3	LC4
4	Adenocarpus complicatus (L.) J.Gay subsp. commutatus (Guss.) Cout.	R1		LC3	EN4
5	Adenostyles alpina subsp. nebrodensis (Wagenitz & I. Müll.) Greuter	E1	CR2	CR3	CR4
6	Agrostis stolonifera L. subsp. stolonifera var. stolonifera				
7	Odontarrhena nebrodensis (Tineo) L.Cecchi & Selvi subsp. nebrodensis]	R1			
8	Alissum siculum Jord.	R1			LC4
9	Allium aetnense Brullo, Pavone & Salmeri			NT3	LC4
10	Allium agrigentinum Brullo & Pavone in Brullo et al.	R1		LR3	EN4
11	Allium castellanense (Garbari, Miceli & Raimondo) Brullo, Guglielmo, Pavone & Salme			CR3	EN4
12	Allium cupani Rafin.			LR3	LC4
13	Allium franciniae Brullo & Pavone	R1		NT3	NT4
14	Allium hemisphaericum (Sommier) Brullo	R1		VU3	VU4
15	Allium lehmannii Lojac.	V1		LR3	NT4
16	Allium lopadusanum Bartolo, Brullo & Pavone	V1	EN2	EN3	EN4
17	Allium nebrodense Guss.	NT1		EN3	VU4
18	Allium obtusiflorum DC. in Redoute	E1		LC3	
19	Allium panormitanum Brullo, Pavone & Salmeri			VU3	LC4
20	Allium pelagicum Brullo, Pavone & Salmeri			VU3	NT4
21	Allium vernale Tineo in Guss.			CR3	VU4
22	Amelanchier ovalis subsp. embergeri Favarger & Stearn	R1			
23	Anisantha sterilis (L.) Nevski var. sicula (Strobl) H. Scholz				
24	Anthemis aeolica Lojac.			CR3	CR4
25	Anthemis aetnensis Schouw in Sprengel	NT1		LR3	NT4
26	Anthemis cossyrensis (Guss.) Guss.			LC3	
27	Anthemis cupaniana Tod. ex Nyman	NT1		NT3	NT4
28	Anthemis intermedia Guss.			LC3	
29	Anthemis ismelia Lojac.	R1	CR2	CR3	VU4
30	Anthemis lopadusana Lojac.	V1	EN2	LC3	
31	Anthemis messanensis Brullo in Bartolo, Brullo & Pulvirenti		VU2	CR3	CR4
32	Anthemis muricata (DC.) Guss.	R1	VU2	LR3	
33	Anthemis parlatoreana Raimondo, Bajona, Spadaro & Di Gristina				
34	Anthemis pignattiorum Guarino, Raimondo & Domina			CR3	EN4
35	Anthemis pseudoabrotanifolia C. Brullo, Brullo & Giusso			DD3	
36	Anthyllis hermanniae L. subsp. sicula Brullo & Giusso		EX2	EX3	EX4
37	Anthyllis vulneraria L. subsp. busambarensis (Lojac.) Pignatti	R1		LR3	NT4
38	Ajuga tenorei C. Presl	R1			LC4
39	Aquilegia sicula (Strobl) E. Nardi			CR3	LC4
40	Arabis madonia C. Presl in C. & J. Pres1			CR3	DD4
41	Arabis rosea DC.	R1			

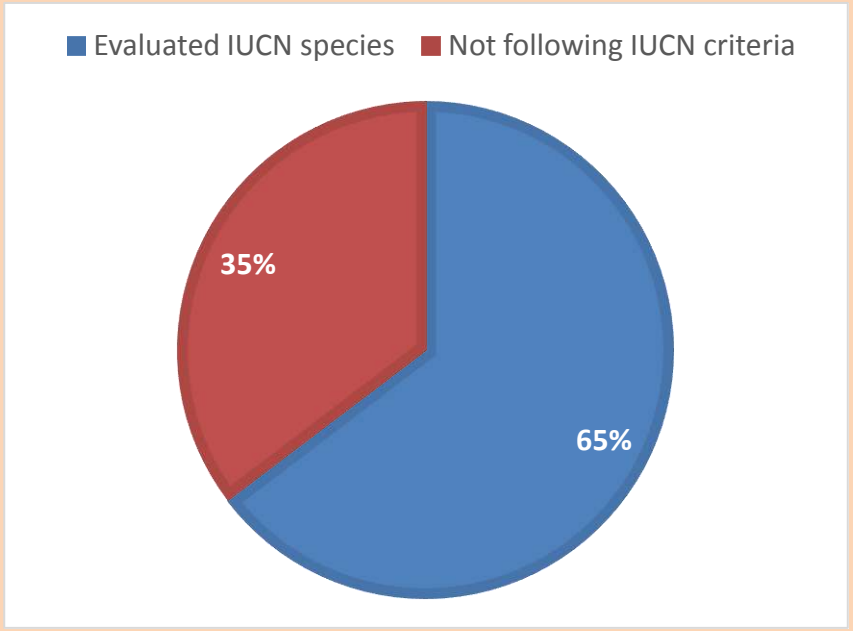
The working table

Missing species	30
Total species evaluated	400

	N° species evaluated	N° species not evaluated
Raimondo et al. (1992)	203	227
Raimondo et al. (2011)	134	296
Brullo C. & Brullo S. (2020)	366	64
Rossi G. et al. (2013., 2020)	278	152



Percentage of Sicilian endemic taxa not yet evaluated (missing species)



Percentage of Sicilian endemic taxa evaluated according to the IUCN criteria

	A	B	C	D	E
242	Limonium aegusae Brullo	E1	CR2	VU3	VU4
243	Limonium albidum (Guss.) Pignatti	R1		CR3	CR4
244	Limonium algusae (Brullo) Greuter	R1		LC3	CR4
245	Limonium bocconei (Lojac.) Litard. in Briq.	NT1		LC3	NT4
246	Limonium calcarae (Todaro ex Janka) Pignatti	V1	EN2	CR3	CR4
247	Limonium catanense (Tineo ex Lojac.) Brullo	R1	EX2	EX3	EX4
248	Limonium catanzaroi Brullo	V1	CR2	LR3	CR4
249	Limonium cophanense C. Brullo, Brullo, Cambria, Giusso & Ilardi			CR3	VU4
250	Limonium cosyrense (Guss.) O. Kuntze	R1		LR3	LC4
251	Limonium densiflorum (Guss.) O. Kuntze	R1	VU2	EN3	
252	Limonium flagellare (Lojac.) Brullo	NT1		LR3	LC4
253	Limonium furnarii Brullo	R1	EN2	CR3	NT4
254	Limonium halophilum Pignatti in Brullo	R1		VU3	
255	Limonium hyblaeum Brullo	R1		VU3	LC4
256	Limonium intermedium (Guss.) Brullo	RE1	EW2	EW3	EW4
257	Limonium ionicum Brullo	V1	EN2	CR3	VU4
258	Limonium lilybaeum Brullo	V1	VU2	VU3	NT4
259	Limonium lojaconoi Brullo	R1	VU2	VU3	LC4
260	Limonium lopadusanum Brullo	R1	VU2	VU3	LC4
261	Limonium mazarae Pignatti in Brullo	R1	VU2	CR3	NT4
262	Limonium melancholicum Brullo, Marceno & Romano		CR2	VU3	NT4
263	Limonium minutiflorum (Guss.) O. Kuntze	R1		LR3	VU4
264	Limonium optimae Raimondo	R1	EN2	EN3	NT4
265	Limonium opulentum (Lojac.) Brullo	V1	EN2	EN3	CR4
266	Limonium pachynense Brullo	R1	CR2	CR3	CR4
267	Limonium panormitanum (Todaro) Pignatti	V1	VU2	CR3	CR4
268	Limonium parvifolium (Tineo) Pignatti	V1		CR3	LC4
269	Limonium pavonianum Brullo	V1	EN2	EN3	NT4
270	Limonium poimenum Ilardi, Brullo, Cusimano & Giusso			EN3	NT4
271	Limonium ponzoi (Fiori & Béguinot) Brullo	R1	VU2	VU3	LC4
272	Limonium secundirameum (Lojac.) Brullo	R1	EN2	RN3	CR4
273	Limonium selinuntinum Brullo	R1		CR3	NT4
274	Limonium sibthorpianum (Guss.) O. Kuntze	R1	CR2	CR3	
275	Limonium syracusanum Brullo	R1		LR3	LC4
276	Limonium tauromenitanum Brullo	V1	CR2	CR3	CR4
277	Limonium tenuiculum (Tineo ex Guss.) Pignatti	R1		LC3	LC4
278	Limonium todaroanum Raimondo & Pignatti	E1	CR2	CR3	CR4
279	Limonium usticanum Giardina & Raimondo			VU3	LC4
280	Linaria multicaulis (L.) Miller subsp. aetnensis Giardina & Zizza			LC3	LC4
281	Linaria multicaulis (L.) Miller subsp. humilis (Guss.) De Leonardis, Giardina & Zizza			VU3	EN4
282	Linaria multicaulis (L.) Miller subsp. multicaulis		VU2	VU3	EN4

	A	B	C	D	E
294	Myosotis tineoi C. Brullo & Brullo			CR3	
295	Muscari lafarinae (Tineo ex Lojac.) C. Brullo & Brullo	V1	VU2	CR3	
296	Narcissus obsoletus (Haw.) Steud.				
297	Neotinea commutata (Tod.) R.M. Bateman			VU3	
298	Odontarrhena nebrodense (Tineo) L. Cecchi & Selvi			LR3	NT4
299	Odontites bocconei (Guss.) Walp. subsp. angustifolius (Lojac.) Giardina & Raimondo			LR3	LC4
300	Odontites bocconei (Guss.) Walp. subsp. bocconei	NT1		VU3	LC4
301	Odontites rigidifolius (Biv.) Bentham in DC.			LC3	LC4
302	Oncostema cerulea (Rafin.) Speta		EN2	EN3	LC4
303	Oncostema dimartinoi (Brullo & Pavone) Conti & Soldano	E1	CR2	CR3	EN4
304	Oncostema hughii (Tineo ex Guss.) Speta	V1	EN2	CR3	LC4
305	Oncostema sicula (Tineo ex Guss.) Speta	E1	EN2	VU3	CR4
306	Onosma echioides (L.) L. subsp. canescens (C.Presl) Peruzzi & N.G.Passal.			VU3	NT4
307	Ophrys archimedea Delforge & M. Walravens in Delforge			CR3	LC4
308	Ophrys biancae (Tod.) Macchiati		EN2	EN3	LC4
309	Ophrys caesiella P. Delforge			CR3	
310	Ophrys calliantha Bartolo & Pulvirenti		VU2	CR3	LC4
311	Ophrys explanata (Lojac.) P. Delforge			CR3	
312	Ophrys flammeola P. Delforge			CR3	LC4
313	Ophrys gackiae P. Delforge			EN3	VU4
314	Ophrys laurensis Melki & Geniez		VU2	CR3	LC4
315	Ophrys lunulata Parl.	R1		LC3	LC4
316	Ophrys numida J. Devillers-Terschuren & P. Devillers				
317	Ophrys obaesa Lojac.			VU3	LC4
318	Ophrys oxyrrhynchos Tod.	R1		EN3	LC4
319	Ophrys pallida Rafin.	R1		LR3	VU4
320	Ophrys panormitana (Tod.) Soo			CR3	LC4
321	Ophrys calocaerina Devillers-Tersch. & Devillers				
322	Ophrys sphegodes Mill. subsp. grassoana Cristaudo, Galesi R. Lorenz & Zelesny			VU3	DD4
323	Orchis brancifortii Bib.	NT1			LC4
324	Ornitogalum collinum Guss.	NT1			LC4
325	Orobanche chironii Lojac.	R1	VU2	VU3	NT4
326	Orobanche thapsoides Lojac.		VU2	EX3	CR(PE)4
327	Paeonia mascula subsp. russoi (Biv.) Cullen & Heywood	R1			EN4
328	Petagnaea gussonei (Spreng.) Rauschert	E1	EN2	EN3	EN4
329	Phagnalon metlesicsii Pignatti	E1	CR2	CR3	
330	Pilosella hoppeana (Schult.) F.W.Schultz & Sch. Bip. subsp. sicula Di Grist., Gottschl. &			LC3	
331	Pimpinella gussonei (C. Presl) Bertol.			LC3	LC4
332	Plantago afra L. subsp. zwierleinii (Nicotra) Brullo	R1		LR3	
333	Plantago peloritana Lojac.	E1	EN2	CR3	CR4
334	Poa bivonae Parl. ex Guss.	NT1		VU3	LC4

Oncostema dimartinoi (Brullo & Pavone) F.Conti & Soldano

In conclusion, considering that a part of the Sicilian endemic contingent has not yet received any evaluation of its status and that a significant part of the taxa has yet to be evaluated according to scientific standards, therefore, there is a need to further invest in research aimed at highlighting the real conditions of danger or conservation of the Sicilian endemic contingent which, due to its uniqueness, is not only of regional or national interest

Thanks for your attention

Ptilostemon greuteri Raimondo & Domina